Validation of the World Health Organization-5 Well-Being Index; Assessment of Maternal Well-Being and its Associated Factors

Forough MORTAZAVI[1], Seyed-Abbas MOUSAVI[2], Reza CHAMAN[3], Ahmad KHOSRAVI[4]

SUMMARY

Objective: The aim of this study was to validate the World Health Organization-5 Well-Being Index (WHO-5) in a sample of pregnant Iranian women, to explore the changes in maternal well-being from pregnancy to postpartum, and to determine the factors associated with maternal well-being.

Materials and Methods: This study included 341 pregnant women that presented to healthcare centers affiliated with Shahroud University of Medical Sciences, Iran, in 2011. The participants completed the General Health Questionnaire (GHQ-28) and Farsi version of WHO-5 during the third trimester of pregnancy and at 2 months postpartum.

Results: Cronbach's alpha coefficient for WHO-5 items was 0.85. The correlation coefficient between WHO-5 and GHQ-28 was –0.64 ($P < 0.001$). Exploratory factor analysis yielded 1 factor with an eigen value equal to 3.15, which explained 63.1% of the total variance. Confirmatory factor analysis confirmed the 1-factor structure. The area under ROC curve was 0.82. A WHO-5 cut-off score of <50 exhibited optimal sensitivity (0.84) and specificity (0.59) for identifying psychological symptoms (GHQ-28 score ≥24). There was a significant difference between third trimester (58.4 ± 22) and postpartum (64.1 ± 22.3) mean WHO-5 scores ($P < 0.001$). Maternal level of education (OR = 1.130; 95% CI: 1.307, 1.232) was the only predictor of maternal well-being during third trimester. Breastfeeding difficulty (OR = 0.923; 95% CI: 0.882, 0.965) and maternal well-being scores during third trimester (OR = 1.038; 95% CI: 1.019, 1.058) were predictors of maternal well-being during the postpartum period.

Conclusions: The Farsi version of WHO-5 was observed to be a reliable and valid instrument for screening psychological symptoms in pregnant Iranian women. The present findings show that maternal well-being improved following childbirth.

Keywords: Pregnant women, postpartum period, mental health, prenatal diagnosis

INTRODUCTION

The World Health Organization (WHO) (1984) defines health as a state of physical, mental, and social well-being, not merely the absence of disease. By fostering a broader and more comprehensive approach to health this definition gives equal weight to the mental and physical aspects of health. Results from a 2009 survey on health and disease in Tehran, Iran, indicated that the prevalence of psychological symptoms in those aged ≥15 years was 34.2%, and that females' relative risk of developing psychological symptoms was 1.3-fold greater than that of males. Furthermore, it was estimated that about 2 million individuals in Tehran required psychological treatment (Noorbala et al. 2011).

Whereas there are many instruments used to screen for psychological symptoms, most are lengthy and time-consuming. A good screening instrument should be concise, clear, easy to use, and well accepted by researchers and those being screened. A good example of such a questionnaire is the World Health Organization-5 Well-Being Index (WHO-5) (WHO 1998), which has been used to evaluate well-being

Received: 24.02.2013 - **Accepted:** 11.09.2013

[1]PhD/Assist. Prof., Sabzevar University of Medical Sciences, Reproductive Health, Sabzevar, [2]MD/Assist. Prof., Golestan University of Medical Sciences, Psychiatry, Gorgan, [3]MD/Assoc. Prof., Yasuj University of Medical Sciences, Epidemiology, Yasuj, [4]PhD candidate, Shahroud University of Medical Sciences, Epidemiology, Shahroud, Iran.

Correspondent author: Seyed-Abbas MOUSAVI

e-mail: *mosavi19@yahoo.com*

in general populations and in patient populations. The first version WHO-5 included 28 items, but was subsequently reduced to 10 items following a study on alternative therapies for diabetes patients by Bech et al. (1996). These 10 items were then reduced to 5 and the 5-item version was used to screen for depression in the general population in 1998 (WHO 1998). According to several studies, WHO-5 can be completed in only1-2 mins (Saipanish et al. 2009; De Wit et al. 2007; Heun et al. 2001; Bech et al. 1996). The validity and reliability of WHO-5 in the general population (Saipanish et al. 2009), diabetic teenagers (De Wit et al. 2007), the elderly (aged > 50 years) (Heun et al. 1999), and individuals presenting to primary healthcare centers (Henkel et al. 2003) has been examined and confirmed. Henkel et al. (2003) reported that WHO-5 could identify more depressed patients than the General Health Questionnaire (GHQ-12), Patient Health Questionnaire (PHQ-9), and unaided clinical diagnosis in a setting of 18 primary care centers in Germany. A study from Thailand reported that WHO-5 had a sensitivity of 89% and a specificity of 71% for identifying depression based on a cut-off score of <12 (Saipanish et al. 2009).

Pregnancy is a period characterized by physical and emotional stress, accompanied by gradual physiological and psychological changes. At the end of this period, almost immediately following childbirth, changes occur in many of the body's physiological systems. Common physical problems and an unstable psychological state during third trimester and early postpartum can negatively affect a woman's ability to feed and care for her baby (Marchant 2009; Raynor and Oates 2009). Psychological symptoms occur at a higher rate in pregnant women than non-pregnant women and adversely affect pregnancy and postpartum outcomes (Golbasi et al. 2010; Haas et al. 2005; Gotlib et al. 1989). It is therefore necessary to routinely screen for psychological symptoms during pregnancy and postpartum; however, due to the lack of a valid and concise screening instrument for use in primary healthcare centers women with psychological symptoms during pregnancy and/or postpartum are undiagnosed. As such, it is important to validate an appropriate instrument for screening psychological symptoms during third trimester and postpartum.

WHO-5 is a concise instrument designed to assess emotional well-being during the previous 2-week period, and is appropriate for use in primary health care centers, where the number of clients is high but the number of personnel is limited. Moreover, the WHO-5 is available in Farsi, and as it is a short form (5 items) and easy to complete it may be suitable for screening psychological symptoms in prenatal and postpartum care settings in Iran. We decided to test the validity of WHO-5 based in a population of women in the third trimester of pregnancy, because identifying psychological symptomspathology and implementing interventions during this stage of pregnancy can be of great value in preventing psychopathology during the high-risk early postpartum period. The aim of this study, therefore, was to determine the reliability and validity of WHO-5 in a sample of pregnant Iranian women. In addition, changes in WHO-5 score from pregnancy to postpartum, and the factors associated with low WHO-5 scores were examined. To the best of our knowledge the present study is the first to validate WHO-5 in pregnant women in Iran.

MATERIALS and METHODS

This study included 341 pregnant women that presented to 10 healthcare clinics affiliated with Shahroud University of Medical Sciences, Shahroud, Iran, in 2011. The participants were followed-up until 8 weeks postpartum. The healthcare system in Iran provides free, regularly scheduled prenatal and postpartum care and other services to pregnant women registered at healthcare centers. According to the Iranian Ministry of Health, 98% and 94% of pregnant women present to healthcare centers ≥1 and ≥4 times, respectively, during pregnancy (UNICEF 2011). The sampling method for this study was convenient, because of the ease of access to healthcare and time-efficient data collection. The participants were selected consecutively among the pregnant women that were registered to healthcare centers for prenatal care. Inclusion criteria were as follows: third trimester of pregnancy with a live fetus, and the ability to read and write.

In total, 390 women that satisfied the inclusion criteria were invited to participate, of which 358 agreed. In all, 341 women were followed-up until 8 weeks postpartum (95%). Exclusion criteria were the presence of major psychological and medical pathology (e.g. depression, disabilities, and Substance abuse), and the occurrence of acute stressful events during the course of the study (e.g. loss of a family member or divorce). One mother was excluded from the study due to infant mortality, and 16 dropped out due to relocation and registration at other healthcare centers (n = 5), or temporarily relocating to another city to be with their mothers for the birth and returning after 8 weeks postpartum (n = 11).

The study included 3 clinic visits; the fist visit occurred during third trimester , and the 28-Item General Health Questionnaire (GHQ-28), WHO-5, and World Health Organization Quality of Life, Brief Version (WHOQOL-BREF) were administered; the second visit was at 4 weeks postpartum, during which time the Breastfeeding Experience Scale (BES) was administered; the third visit was at 8 weeks postpartum, and again the GHQ-28, WHO-5, and WHOQOL-BREF were administered. The participants were informed about aims of the study, and were told that their participation was voluntary and that all their information would be kept confidential; they then provided written informed consent and were given instructions on how to complete the questionnaires. The midwives also completed two interview forms that collected personal and obstetrical information. The Ethics Committee of the Shahroud University of Medical Sciences approved the study protocol (approval no. 900.02).

Instruments

Interview Forms: A form was used to collect sociodemographic data (age, level of education, employment status, monthly family income, type of residence, maternal chronic diseases) and was completed during the third trimester of pregnancy. Another interview form for collecting obstetrical data (parity, planned/unplanned pregnancy, mode of delivery, infant birth weight, infant feeding method, infant hospitalization, mother's hospitalization during pregnancy and postpartum, and pregnancy complications) was completed during the 2 postpartum visits.

World Health Organization-5 Well-Being Index (WHO-5): The WHO-5 questionnaire (World Health Organization 1998) consists of 5 positively worded items about the respondent's feelings during the preceding 2-week period. The 5 items are as follows: I have felt cheerful and in good spirits; I have felt calm and relaxed; I have felt active and vigorous; I woke up feeling fresh and rested; My daily life has been filled with things that interest me. Each item is rated on a 6-point Likert-type scale of 0-5, with 0 indicating the lack of positive feelings during the preceding 2-weeks and 5 indicating consistent positive feelings. The raw scores are transformed into a scale ranging from 0 to 100. Scores ≤50 are indicative of a poor emotional state and the need for further testing. The questionnaire has been translated by WHO into numerous languages, including Farsi (WHO Collaborating Center for Mental Health 1998).

28-Item General Health Questionnaire (GHQ-28): The GHQ-28 (Goldberg and Hillier 1979) includes 28 questions divided into 4 subscales: somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. Each subscale is scored on a 4-point Likert-type scale ranging from 0 to 3. The total score ranges from 0 to 84; higher scores indicate lower-level psychological well-being. The questionnaire has been validated in pregnant and postpartum women (Sharp 1988; Nott and Cutts 1982). The cut-off score for screening psychological symptoms in the Iranian population was calculated as 24 (Noorbala et al. 2009; Ebrahimi et al. 2007). The sensitivity and specificity of the questionnaire were reported to be 70.5% and 92.3%, respectively, and the overall misclassification rate was 12.3% according to Noorbala et al. (2009), versus 0.80%, 0.99%, and 0.10% according to Ebrahimi et al. (2007).

World Health Organization Quality of Life, Brief Version (WHOQOL-BREF): The WHOQOL-BREF (World Health Organization 1996) consists of 24 questions divided into 4 subscales: physical, psychological, social relationships, and environment. Two additional questions concern the respondent's overall perception of his or her quality of life and health. Each subscale is scored on a 5-point Likert-type scale ranging from 1 to 5. The raw subscale scores are converted to a 0-100 scale; higher scores indicate better QOL. The validity of the WHOQOL-BREF has been confirmed in the general Iranian population (Nedjat et al. 2008).

Breastfeeding Experience Scale (BES): BES (Wambach 1990) consists of 30-items measuring breastfeeding experiences, practices, and outcomes. We used the first 18-items that assess the severity of common breastfeeding problems during the early postpartum period. The items are scored a 5-point Likert-type scale (1 = not at all and 5 = unbearable). The total score ranges from 18-90, with higher scores indicating greater severity. The content validity and internal consistency of the scale (alpha coefficient 0.76) was supported during the early development of BES (Wambach 1990). In the present study the alpha coefficient was (0.82) at 4 weeks postpartum.

Statistical analysis

Data analysis was performed using SPSS v.18.0 for Windows. The reliability of the Farsi version of WHO-5 was assessed via Cronbach's alpha coefficient (alpha if item deleted), and inter-item and item-total correlation coefficients. Cronbach's alpha values of 0.7-0.8, item-total correlation coefficients >0.20, and inter-item correlation coefficients <0.80 and >0 were regarded as satisfactory. An item was considered for removal if its deletion resulted in a >0.1 increase in Cronbach's alpha coefficient (Streiner and Norman 1995). Exploratory factor analysis (EFA) was used to investigate the factor structure of WHO-5 within the study sample. Criteria for retaining factors were an eigen value >1, jointly explaining >50% of the total variance, and factor loadings >0.40 (Dixon 2001). Confirmatory factor analysis (CFA) was conducted via structural equation modeling to confirm the factor structure suggested by previous studies, using Lisrel v.18.0. We adopted criteria of appropriateness of the factor structure introduced by Aroian and Norris (2001). Concurrent validity was examined via calculating Pearson's correlation coefficients between WHO-5, and GHQ-28 and WHOQOL-BREF. Correlation coefficients >0.50 were considered indicative of good concurrent validity in similar instruments. For known group comparison the mean WHO-5 score was calculated for the participants with and without financial problems and marital difficulty. Well-being was expected to decrease as the severity of financial problems and marital difficulty increased. Sensitivity and specificity were determined based on ROC curve (receiver operating characteristic curve) analysis. The WHO-5 cut-off score of 50 was associated with the GHQ-28 cut-off score of 24.

The paired t-test was used to compare WHO-5 third trimester and postpartum scores. The chi-square test was used to test the independence of WHO-5 during pregnancy and postpartum. Univariate logistic regression analysis was used to identify the association between negative and positive subgroups (i.e. WHO-5 score ≥50 and WHO-5 score <50), in terms of sociodemographic and obstetric factors during pregnancy and postpartum. All variables that were associated with WHO-5 score with a probability of <0.25 in each period were subjected to multivariate logistic regression analysis to identify independent predictors of a WHO-5 score <50 (Hosmer and Lemeshow 1989). The significance level of tests was set at 0.05.

RESULTS

Participants

Mean age of the participants was 26.1 ± 4.4 years. The level of education among the participants was as follows: primary school: 12.1%: middle school: 15.7%; high school: 44.7%; university: 27.5%. All the participants (100%) were married. Mean gestational age at delivery was 37 ± 1.2 weeks (range: 34-40 weeks). The monthly family income of 64% of the participants was lower than the mean of the sample and was not associated with WHO-5 score. Table 1 shows the mean ± SD for each of the WHO-5 items and the distribution of responses to each. All the participants answered all 5 items. There was a significant difference in mean WHO-5 score between the primipara (60.74 ± 21.2) and multipara participants (55.46 ± 22.6) (P = 0.025).

Reliability

Cronbach's alpha coefficient for WHO-5 was 0.85. All corrected item-total correlation coefficients were between 0.48 and 0.56. Inter-item correlation coefficients were between 0.44 and 0.65. Deleting each item only resulted in a slight reduction in Cronbach's alpha coefficient (0.01-0.05).

Validity of WHO-5

Exploratory factor analysis: Exploratory factor analysis was conducted. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.85 and Bartlett's test of sphericity was significant (x^2 = 720.14, P < 0.001), indicating the suitability of the data for factor analysis. Factor analysis yielded 1 factor with an eigenvalue equal to 3.15, which explained 63.1% of total variance. All the items had a factor loading >0.74.

Table1. The percentage of participant responses to each WHO-5 item

During the previous 2 weeks	0	1	2	3	4	5	Mean ± SD
I have felt cheerful and in good spirits	1.4	25.1	5.9	23.4	36.9	7.3	2.9 ± 1.3
I have felt calm and relaxed	2.3	15.8	12.4	21.1	37.2	11.3	3 ± 1.3
I have felt active and vigorous	5.4	19.7	14.6	25.9	25.4	9	2.7 ± 1.4
I woke up feeling fresh and rested	4.2	19.2	9.6	24.2	30.7	12.1	2.9 ± 1.4
My daily life has been filled with things that interest me	2.3	18.9	10.7	25.1	32.4	10.7	2.9 ± 1.3

At no time (0), some of the time (1), less than half of the time (2), more than half of the time (3), most of the time (4), all of the time (5).

Table 2. Results of confirmatory factor analysis of the WHO-5 items

Fit measure	Farsi version of WHO-5	Recommended value†
Minimum fit function (chi^2)	10.86	
	P = 0.054	P > 0.05
Minimum fit function/degrees of freedom (chi^2/df)	2.17	<5.00
Goodness of fit index (GFI)	0.99	> 0.90
Normed fit index (NFI)	0.99	> 0.90
Non-normed fit index (NNFI)	0.99	> 0.9
Root mean square error of approximation (RMSEA)	0.057	0.08>
Comparative fit index (CFI)	0.99	0.90 <

† according to Aroian and Norris (2001)

Table 3. Distribution of the frequency of postpartum WHO-5 scores based on antepartum WHO-5 score

	Antepartum WHO-5 Score				Total	
	<50		≥ 50			
Postpartum WHO-5	n	%	n	%	n	%
<50	54	15.8%	34	10.0%	88	25.8%
≥50	64	18.8%	189	55.4%	253	74.2%
Total	118	34.6%	223	65.4%	341	100.0%

Confirmatory factor analysis: Confirmatory factor analysis was used to determine if the WHO-5 Farsi version had the same 1-factor structure as the original version; the findings are shown in Table 2 F .

Concurrent validity: The correlation coefficients between WHO-5, and GHQ-28 and WHOQOL-BREF were –0.64 and 0.60, respectively, indicating moderate correlation (P < 0.001). As the level of maternal education, intention to breastfeed, and the intended duration of breastfeeding increased the WHO-5 score increased (R = 0.11 and P = 0.037, R = 0.277 and P < 0.001, and R = 0.154 and P = 0.004, respectively). Those with higher parity had lower WHO-5 scores (R = –0.168, P = 0.001).

Known group comparison: Mean WHO-5 score among those with a GHQ-28 score <24 (67.5 ± 19.5) was higher than among those with a GHQ-28 score ≥24 (46.3 ± 18.9) (P < 0.001). It was assumed that the participants with financial problems or marital difficulty would have lower WHO-5 scores than emsthose that didn't. The findings show that the mean WHO-5 score in the participants with financial problems (48.1 ± 21.5) was lower than those without financial problems (59.7 ± 21.7) (P = 0.002), and that the mean WHO-5 score in those with marital difficulty (36.6 ± 25.7) was lower than that in those without marital difficulty (58.9 ± 21.6) (P = 0.008).

Table 4. Results of univariate logistic regression analyses of WHO-5 on socio-demographic and obstetrical variables

	Positive group WHO5 <50	Negative group WHO5 ≥50	OR	95% CI	P
Pregnancy					
Sociodemographic and Obstetric Factors	**Mean ± SD**	**Mean ± SD**			
Maternal Age	26.1 ± 4.5	26.2 ± 4.4	1.040	0.956, 1.055	0.872
Maternal Education	10.9 ± 3.2	11.7 ± 3.9	1.511	0.998, 1.125	0.058
Pregnancy BMI (Kg/m^2)	24.6 ± 4.4	23.8 ± 4.2	0.975	0.021, 0.897	0.185
Monthly family income (million RLS)	401 ± 129	436 ± 158	1.002	1.000, 1.004	0.063
	n (%)	**n (%)**			
Employed	13 (10.6)	19 (8.1)	1.110	0.507, 2.447	0.441
House (rented)	62 (52.5)	113 (50.7)	0.801	0.513, 1.253	0.742
Maternal Chronic Diseases	10 (8.5)	8 (3.5)	0.396	0.197, 0.319	0.058
Father's Smoking	11 (9.4)	13 (5.8)	0.599	0.260, 1.383	0.230
Multiparous	50 (40.7)	97 (41.5)	0.843	0.542, 1.311	0.448
Unwanted Pregnancy	18 (14.6)	25 (10.7)	0.772	0.140, 1.486	0.282
Female Infant	54 (45.8)	122 (54.2)	0.701	0.449, 1.096	0.119
Pregnancy Complications	28 (23.7)	66 (29.5)	1.340	0.720, 1.979	0.260
Postpartum					
	Mean ± SD	**Mean ± SD**			
Pregnancy Weight Gain (kg)	12.1 ± 8.4	11.4 ± 7.7	0.948	0.892, .0994	0.028
Postpartum Weight Loss (kg)	8.8 ± 3.1	7.1 ± 8.7	0.917	0.827, 1.016	0.099
Breastfeeding Difficulty score	33.1 ± 8.6	30.4 ± 8.2	0.930	0.903, 0.958	<0.001
	n (%)	**n (%)**			
Maternal Chronic Diseases	9 (10)	9 (3.5)	0.747	0.442, 3.878	0.143
Postpartum Re-hospitalization	8 (9.2)	12 (4.8)	0.496	0.889, 6.192	0.139
Cesarean Delivery	48 (53.3)	135 (52.9)	0.984	0.548, 1.450	0.651
Infant Complimentary Feeding†	13 (14.4)	20 (7.8)	0.539	0.946, 4.200	0.111
WHO-5 score <50 during Pregnancy	59 (63.4)	64 (24.2)	4.069	2.707, 7.729	<0.001

Statistical differences:
*P < 0.05
**P < 0.01
***P < 0.001
Chi-square test
†Complementary feeding (breast milk plus formula), vs. full breastfeeding (breast milk and other fluids).

Table 5. Results of multivariate logistic regression analyses of WHO-5 on sociodemographic and obstetric variables

	OR	CI
Pregnancy		
Maternal Education ≤ primary school	1.130	1.030, 6.564
Constant	0.182	
Postpartum		
WHO-5 score <50 during Pregnancy	1.038	1.019, 1.058
Breastfeeding Difficulty score	0.923	0.882, 0.965
Constant	5.461	

Variables associated with WHO-5 with P < 0.25 were entered in regressions.

Predictive validity: Analysis of the ROC curve indicated that a WHO-5 cut-off score of 50 was the best for identifying psychological symptoms (GHQ-28 score ≥24) with sensitivity and specificity of 0.84 and 0.59, respectively. The area under the curve was 0.82 (95% CI: 0.78-0.86), which was significantly different than 0.5 (P < 0.001).

Comparison of WHO-5 scores during pregnancy and the postpartum period

T-test showed that there was a statistical difference between the mean WHO-5 score during the third trimester of pregnancy (58.4 ± 22) and postpartum (64.1 ± 22.3) (P < 0.001).

Also, the chi-square test indicated that the percentage of women with a WHO-5 score <50 decreased from pregnancy (34.6%) to postpartum (25.8%) (P < 0.001) (Table3).

Factors associated with maternal well-being index during pregnancy and postpartum

The results of univariate and multivariate logistic regression analysis of WHO-5 scores during the third trimester of pregnancy and postpartum on sociodemographic and obstetrical variables are presented in Tables 4 and 5.

DISCUSSION

The 3 questionnaires used in the present study each assess different aspects of psychological and general health. WHO-5 assesses the level of emotional well-being during the preceding 2-week period. The present study is the first to assess the validity and reliability of WHO-5 in pregnant women in Iran. The findings indicate that the Farsi version of WHO-5 is a reliable and valid instrument for screening psychological symptoms in pregnant women in Iran. All the participants answered all 5 items , which demonstrates that the all the participants understood all WHO-5 items. Furthermore, there wasn't a ceiling or floor effect. Internal consistency was satisfactory (0.82) and was comparable to previous studies that reported it to be 0.82 (De Wit et al. 2007), 0.87 (Saipanish et al. 2009), 0.83 (De Souza and Hidalgo 2012), 0.84 (Momtaz et al. 2010), and 0.86 (Lucas-Carrasco 2012). In terms of validity, WHO-5 performed well. Exploratory and confirmatory factor analyses confirmed the 1-factor structure with an eigenvalue of 3.15, explaining 63.1% of the total variance of WHO-5 in the study population. These findings are in agreement with those of earlier studies, all of which reported a 1-factor structure, with total variance of 59% (De Souza and Hidalgo 2012), 61.5% (Momtaz et al. 2010), 62.5% (De Wit et al. 2007), 66% (Lucas-Carrasco 2012), and 66.8% (Saipanish et al. 2009). Concurrent validity was confirmed based on the moderate correlation between WHO-5 and GHQ-28 scores (–0.64), and between WHO-5 and WHOQOL-BREF scores (0.60). Lucas-Carrasco' (2012) reported that the correlation coefficients between WHOQOL-BREF subscale scores and WHO-5 score varied between 0.37 and 0.66. Considering the sensitivity (84%) and specificity (59%) of WHO-5 < 50 in this study, it was observed to be moderately to highly correlated with the presence or absence of psychological symptoms in pregnant women. De Wit's study (2007) on diabetic adolescents confirmed that a WHO-5 cut-off score <50 was optimal for identifying mild to severe depression with a sensitivity 89% and specificity of 87%. While Saipanish (2009) reported that a WHO-5 cut-off score <12 (scale: 0-25) had the best sensitivity (89%) and specificity (71%) for identifying depression in a primary care setting, and De Souza and Hidalgo (2012) reported that a cut-off score <19 (scale: 0-25) had the best sensitivity (66%) and specificity (59%) for identifying depression in a rural population.

In contrast to earlier studies that have reported a higher prevalence of psychological symptoms in primiparous women (Abiodun et al. 1993), in the present study WHO-5 scores in the primiparous participants were higher than multiparous group. In the present study as WHO-5 score increased the determination to breastfeed increased. Additional research is needed to further assess the relationship between postpartum WHO-5 score, and breastfeeding self-efficacy (maternal confidence) and duration of breastfeeding. The present findings show that maternal well-being was better at 2 months postpartum than during the third trimester of pregnancy, which are in agreement with earlier reports indicating that a woman's general health, quality of life, and psychological symptoms improve postpartum (Traviss et al. 2012; Haas et al. 2005; Otchet et al. 1999). Nonetheless, 25.8% of the participants in the present study had a WHO-5 score <50 in the postpartum period. This prevalence of poor maternal well-being in the postpartum period in the present study was higher than previously reported (Traviss et al. 2012; Haas et al. 2005), indicating the importance of screening for psychological symptoms in the postpartum .

In the present study maternal level of education was the only predictor of maternal well-being during third trimester, which is in contrast to an earlier report of no association between maternal level of educational and psychological symptoms (Wingwontham et al. 2008). Additionally, breastfeeding difficulty during early postpartum and maternal WHO-5 score during third trimester were predictors of maternal well-being postpartum. It was previously reported that maternal symptoms of depression during late pregnancy strongly predicted maternal symptoms of depression during the postpartum period (Leigh and Milgrom 2008). Another study reported that maternal symptoms of depression increased the likelihood a mother would be dissatisfied with her method of infant feeding (Dennis and McQueen 2007).

Earlier studies focused primarily on the prevalence of postpartum depression, whereas the present study examined maternal well-being during third trimester and the postpartum period. A major advantage of WHO-5 is that it is not designed for a particular group or period; it can be used as a part of routine assessment in prenatal care as an initial screening for psychological symptoms in pregnant women, to be followed by additional assessment if required.

Implications for Practice and Policy

Some of the present findings have practical implications for maternity care. Providers of obstetric care should pay more attention to the psychological health of women during pregnancy and consider screening for psychological symptoms as a necessary part of prenatal care. Interventions to promote psychological health within the remaining few weeks left until the delivery should be designed, especially in those with educational level lower than primary school. Also, Screening should be repeated in the postpartum to discover new cases,

especially in those with a breastfeeding difficulty, and low well-being during third trimester pregnancy.

Limitations

The participants in the present study self-completed all the questionnaires. The gold standard for comparing WHO-5 score was the GHQ-28 score. Additional research is necessary to compare the predictive validity of WHO-5 for identifying poor maternal well-being with structured clinical interviews as the gold standard. The present findings are limited to pregnant women in Iran and cannot be generalized to other groups.

Conclusion

The WHO-5 Well-Being Index is a reliable and valid instrument for screening psychological symptoms in pregnant Iranian women. Based on WHO-5 scores, maternal well-being improved postpartum.

Acknowledgement

This study received financial assistance from Shahroud University of Medical Sciences (approval no. 9004).

Author Disclosure Statement

No competing financial interests exist.

REFERENCES

Abiodun OA, Adetoro OO, Ogunbode OO (1993) Psychiatric morbidity in a pregnant population in Nigeria. Gen Hosp Psychiatry, 15: 125-8.

Aroian K, Norris A (2001) Confirmatory factor analysis. Statistical Methods for health Care Research. 4 nd. Monro, B. H. (Ed.) Philadelphia, Lippincott. p. 331- 55

Bech P, Staehr-Johansen K, Gudex C (1996) The WHO (ten) Well-Being Index: validation in diabetes. Psychother Psychosom, 665: 183-90.

De Wit M, Pouwer F, Gemke RJBJ et al (2007) Validation of the WHO-5 Well-Being Index in Adolescents With Type 1 Diabetes. Diabetes care, 30: 2003-6.

Dennis C-L, McQueen K (2007) Does maternal postpartum depressive symptomatology influence infant feeding outcomes? Acta Pædiatr, 96: 590-4.

De Souza CM, Hidalgo MPL (2012) World Health Organization 5-item well-being index: validation of the Brazilian Portuguese version. Eur Arch Psychiatry Clin Neurosci, 262: 239-44. DOI 10.1007/s00406-011-0255-x.

Dixon J (2001) Factor Analysis. Statistical Methods for health Care Research. 4 nd. Monro, B. H. (Ed.) Philadelphia, Lippincott.p. 303-31.

Ebrahimi A, Molavi H, Moosavi G et al (2007) Psychometric Properties and Factor Structure of General Health Questionnaire 28 (GHQ-28) in Iranian Psychiatric Patients. Journal of Research in Behavioural Sciences, 5: 5-11

Golbasi Z, Kelleci M, Kisacik G et al Prevalence and correlates of depression in pregnancy among Turkish women. Matern Child Health J, 14: 485-91.

Goldberg D, Hillier V (1979) A scaled version of general health questionnaire. Psychol Med, 9: 131- 45.

Gotlib IH, Whiffen VE, Mount JH et al (1989) Prevalence rates and demographic characteristics associated with depression in pregnancy and the postpartum. J Consult Clin Psychol, 57: 269-74.

Haas J, Jackson R, Fuentes-Afflick E et al (2005) Changes in the health status of women during and after pregnancy. J Gen Intern Med, 20: 45-51.

Henkel V, Mergl R, Kohnen R (2003) Identifying depression in primary care: a comparison of different methods in a prospective cohort study. BMJ, 8, 155.

Heun R, Bonsignore M, Barkow K et al (2001) Validity of the five-item WHO Well-Being Index (WHO-5) in an elderly population. Eur Arch Psychiatry Clin Neurosci, 251: 27-31.

Heun R, Burkart M, Maier W et al (1999) Internal and external validity of the WHO Well-Being Scale in the elderly general population. Acta Psychiatr Scand, 99: 171-8.

Hosmer D, Lemeshow S (1989) Applied Logistic Regression, New york, John Wiley Inter science publications.

Leigh B, Milgrom J (2008) Risk factors for antenatal depression, postnatal depression and parenting stress. BMC Psychiatry, 16, 24. doi: 10.1186/1471-244X-8-24.

Lucas-Carrasco R (2012) Reliability and validity of the Spanish version of the World Health Organization-Five Well-Being Index in elderly. Psychiatry Clin Neurosci, 66: 508-13.

Marchant S (2009) Physical problems and complications in the puerperium puerperium. Myles. Textbook for Midwives. Fraser, D. & Cooper, M. (Eds.) 15 nd. Edinburgh, Churchill Livingston Elsevier p. 665-79.

Momtaz YA, Ibrahim R, Hamid TA et al (2010) Mediating effects of social and personal religiosity on the psychological well being of widowed elderly people. Omega, 61: 145-62

Nedjat S, Montazeri A, Holakouie K et al (2008) Psychometric properties of the Iranian interview-administered version of the World Health Organization's Quality of Life Questionnaire (WHOQOL-BREF): a population-based study. BMC Health Serv Res, 8, 61.

Noorbala AA, Bagheri Yazdi S, Mohammad K (2009) Validation of GHQ-28 in Iran as a Psychiatric Screening Tool. Hakim Research Journal, 11: 47-53.

Noorbala AA, Bagheri Yazdi SA, Asadi Lari M et al (2011) Mental Health Status of Individuals Fifteen Years and Older in Tehran-Iran (2009). Iranian Journal of Psychiatry and Clinical Psychology, 16: 479- 83.

Nott PN, Cutts S (1982) Validation of the 30-item General Health Questionnaire in postpartum women. Cambridge Journals Online, 12: 409-13.

Otchet F, Carey M, Adam L (1999) General health and psychological symptom status in pregnancy and the puerperium: what is normal? Obstet Gynecol, 94: 935-41.

Raynor M, Oates M (2009) Perinatal mental health. Myles, textbook for Midwives. 15 nd. Fraser, D. & Cooper, M. (Eds.) Edinburgh, Churchill Livingston Elsevier. p. 679-705.

Saipanish R, Lotrakul M, Sumrithe S (2009) Reliability and validity of the Thai version of the WHO-Five Well-Being Index in primary care patients. Psychiatry Clin Neurosci, 63: 141-6.

Sharp DJ (1988) Validation of the 30-item General Health Questionnaire in early pregnancy. Cambridge Journals Online, 18: 503-7.

Streiner D, Norman G (1995) Health Measurement Scales: A Practical Guide to Their Development and Use, Oxford, U.K, Oxford University Press.

Traviss G, West R, House A (2012) Maternal Mental Health and Its Association with Infant Growth at 6 Months in Ethnic Groups: Results from the Born-in-Bradford Birth Cohort study. PLoS ONE, 7, 2 doi:10.1371/journal.pone.0030707

UNICEF (2011) Iran, Islamic Republic of - Statistics. Retrieved October 4 2012, from: www.unicef.org/infobycountry/iran_statistics.html

Wambach KA (1990) Development of an instrument to measure. Breastfeeding outcome: The Breastfeeding Experience Scale. Tucson, the University of Arizona.

WHO Collaborating Center for Mental Health. Psychiatric Research Unit (1998) WHO (Five) Well-Being Index. Hillerød.

Wingwontham S, Thitadilok W, Singhakant S (2008) Prevalence of Mental Health Problem during First-Half Pregnancy at Siriraj Hospital. J Med Assoc Thai, 91: 452-7.

World Health Organization (1998) Well-Being measures in primary health care: The DepCare Project. Health for All. Target 12, Geneva, WHO.

World Health Organization (1984) WHO definition of Health. Retrieved August 2 2012, from: www.who.int/about/definition/en/print.html

World Health Organization (1996) WHOQOL-BREF- introduction, administration, scoring and generic version of the assessment. Geneva, World health organization. Retrieved July 25 2012, from:www.who.int/mental_health/media/en/76.pdf.